WAR FOOD ADMINISTRATION

OFFICE OF MARKETING SERVICES

METHODS EMPLOYED IN THE LABORATORY ANALYSIS OF EVAPORATED MILK

BY THE

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THE CHEMICAL ANALYSES OF EVAPORATED MILK

Evaporated milk is analyzed with a Mojonnier Tester using methods which are essentially the same as those recommended by the Mojonnier Bros. in their Manual.

Determination of Net Weights

A composite of evaporated milk representing 5000 cases is made up as follows:

The odd numbered cans of milk are weighed to an accuracy of 0.01 ounce; these cans are opened, emptied into an adequate container, and poured back and forth at least four times, using another similar sized container. Approximately 2 ounces of the well mixed sample is taken for testing and the remainder of the milk is discarded. The empty cans are washed in plain tap water without soap, dried and reweighed to obtain the net weight. If the average weight of the odd-numbered cans is less than 14.5 ounces (or whatever the contract weight should be), the even numbered cans are also weighed. It is observed that only half of the cans are originally used for compositing. In the event of the milk being below standard in fat, solids, or net weights, the remaining cans may be employed to determine which of the individual lots did not meet specifications.

Solids Determination

With the aid of a pipette distribute evenly approximately 1.0 gm. of well mixed evaporated milk in a previously tared covered aluminum "solids dish." Add 2 ml. distilled water and shake with rotary motion until sample is completely dissolved. Place dish on 180° C "hot plate" and carefully evaporate the mixture to a uniform light tan shade. Transfer dish to the "solids oven" at 100° C, heating for 10 minutes with not less than 20" vacuum. Place in desiccator and cool to room temperature (7 to 10 minutes), reweigh, and calculate as percentage of total solids in the sample.

Butterfat Determination

Transfer into a Mojonnier flask approximately 5.0 gms. of the well mixed composite of evaporated milk (using weighing pipettes and holder), add 5 ml. of distilled water and mix. Next add 1.5 ml. of 28% ammonium hydroxide. The contents are again well mixed. Add 10 ml. of ethyl alcohol and mix thoroughly. Three drops 0.5% phenolphthalein solution are added to more clearly define the ether layer from the residue. Add 25 ml. ethyl ether, stopper and shake vigorously. Next add 25 ml. of petroleum ether, stopper, and again mix by vigorous shaking. With a hand centrifuge, rotate the flask 60 times in a period of 1 minute. Decant the clear ether layer into a weighed aluminum fat dish (high side walls) and evaporate the ether slowly on a hot plate (135° C). The temperature should be sufficient to allow complete evaporation, but not so high that spattering or vigorous boiling will result.

Make a second extraction using 5 ml. of ethyl alcohol (instead of 10 ml. as for the original extraction) and the same quantities of each ether; mix well after the addition of each reagent. Centrifuge 60 times, decant the clear ether layer into the corr esponding aluminum dish and evaporate slowly. If necessary, carefully pour a few ml. of distilled water down the side of the flask just prior to pouring off the second extraction to raise the level of the aqueous layer, so ethers may be completely poured off. It is important that none of the aqueous layer be allowed to run into the aluminum dish. After the ether is entirely evaporated from the aluminum dish on the "hot plate", place it in the Mojonnier oven for 5 minutes with the temperature at exactly 135° C and a vacuum of not less than 20". Transfer and cool to constant weight in the cooling desiccator. In weighing the dishes, both when empty and when containing the extracted fat, they should be at room temperature.. This usually requires cooling in the Mojonnier desiccator for 7 to 10 minutes. Report as percent fat.

When the original composite sample is found to be below Government standards for fat, recheck is made using three extractions.